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IETZKE, J.C.		
IRLINGAME, A.H.		
)PP, R.D.		
)OUCHER, D.W.		
.VIS, J.G.		
'ERED, J.E.	X	X
RRERA, D.W.		
RRIS, L.R.		
AIKOR, F.J.		
ANCIS, G.E.		
)ODWIN, R.		
ALY, T.J.		
EKER, E.H.		
NS, J. P.		
ELE, P. B.		
RSH, J.M.	X	X
RBY, W.A.		
RKEBO, J. A.		
E, E.M.		
AJESTIC, J.R.		
ATHEWS, T.A.		
URRENS, B.E.		
)RGAN, R.V.		
)RTH, P.		
LMER, L.A.		
ZZUTO, V.M.		
)TTER, G.L.		
HOADES, J.L.		
FFELL, B.F.		
VANSON, E.R.		
IEBE, J.S.	X	X
ILKINSON, R.B.		
ILLIAMS, R.E.		
ILSON, J.M.		
)UNG, E.R.		
ANE, J.O.		
Greengard	X	X
Arndt	X	X

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Reviewed for Addressee
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4-25-91
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States Government

Memorandum

Department of Energy
Rocky Flats Office

APR 25 3 37 PM '91

EG&G
ROCKY FLATS PLANT
CORRESPONDENCE CONTROL

APR 26 1991

APR 23 1991

ERD:TO:3020

Environmental Evaluation Review for OU5

J.M. Kersh, Associate General Manager
Environmental Restoration and Waste Management
EG&G Rocky Flats, Inc.

DOE has completed review of the OU5 Final Draft Phase I RFI/RI Work Plan, Woman Creek, Chapter 9.0, Environmental Evaluation. As you can see from the attachment, there are numerous comments on the environmental evaluation chapter. Please respond in writing to each and every comment. When these comments are appropriately addressed, contact DOE and we will schedule a meeting to discuss your responses.

If you have any questions, please feel free to contact Tom Olsen of my staff at extension 2762.

David P. Simonson
Assistant Manager
for Environmental Management

Attachment

cc:
B. Thatcher, Jr., DOE/RFO
T. Greengard, EG&G/RF
M. Arndt, EG&G/RF

ADMIN RECORD

A-OU05-000009

RF-46522 (Rev. 3/91)

SPECIFIC COMMENTS

1. Section 9.1, p. 9-1, paras. 1 & 2: The first sentence in each of these two paragraphs present somewhat inconsistent objectives and goals for the EE. Please review.

2. Section 9.1, p. 9-1, para. 1: Define "environment" in the first sentence. Add "impacts" to "addressing risks to the . . ."

3. Section 9.1.1, p. 9-2, para. 1: The "coordinated approach with OUs 1 & 2" is not evident or elaborated on later in the EEWP.

4. Section 9.1.1, p. 9-2, para. 3: The Task 1 efforts should have already been accomplished as part of the RI scoping.

   The first sentence in this paragraph indicates that DOE regards the EE efforts as outside the scope of the OU5 RFI/RI efforts. This is not correct.

   The Data Quality Objectives cannot be defined in Task 1 because the data needs have not yet been identified.

5. Section 9.1.1, p. 9-2, para. 4: The majority of this work should have already been conducted as part of the RI scoping. Much of what is included under Task 2 is generally considered part of the conceptual model development. We suggest combining Tasks 1 with all or part of Task 2, since they are obviously related.

   The use of the term "preliminary risk assessment" is very questionable. What is being called "preliminary risk assessment" is really "conceptual model development." We question the loose use of the term "preliminary risk assessment" and suggest the term not be used, at least in this context. For example, a risk assessment is not generally used to identify contaminants of concern.

6. Section 9.1.1, p. 9-4, para. 1: Describe the types of "quantitative data on community composition in terrestrial and aquatic habitats" to be developed from the ecological field surveys.

   The "updat(ing) knowledge of site conditions" should really be "updating the conceptual model."

7. Section 9.1.1, p. 9-4, para. 2: It would appear that some level of toxicity assessment needs to be conducted before contaminants of concern can be identified. This paragraph indicates that the contaminants of concern are identified before a toxicity assessment is conducted. Is this all consistent?

8. Section 9.1.1, p. 9-4, para. 3: The "ecological field investigation" in the first sentence should be "ecological field survey."

9. Section 9.1.1, p. 9-4, para. 4: It is unclear why "characterization of the risk or threat of OU5 contaminants to receptor populations and habitats" is being addressed at this stage of the

assessment. It does not appear data are adequate at this stage to characterize risks. Why not wait until the end of the Phase I process.

10. Section 9.1.2, p. 9-6, para. 2: The indications are that all potential contaminants of concern to the EE are included in Tables 2-5 and 2-6. Is this true? If not, how will the EE-specific contaminant data needs be incorporated into the Phase I RI abiotic sampling program?

11. Section 9.1.2.1, p. 9-6, para. 3: The relevance of the information in the fourth sentence in this paragraph is not clear.

Provide more detail on the Talmage and Walton (1990) study.

12. Section 9.1.2, p. 9-7, Table 9-1: Provide sources for these data.

13. Section 9.1.2.1, p. 9-8, para. 2: The statement to the effect that AWQC "were established to be protective of all aquatic life forms" is not precisely correct. Please check to make sure the definition is correct.

14. Section 9.1.2.1, p. 9-8, para. 3: The phrase "detected at elevated levels" in the third sentence is not equivalent to "levels above Federal surface water quality standards." Concentrations can be at elevated levels and not above Federal standards. Please review this for consistency and accuracy.

15. Section 9.1.2.1, p. 9-9, Table 9-2: Provide sources for the data in this table.

16. Section 9.1.2.2, p. 9-12, para. 1: The statement in the second sentence (beginning with "The same is true . . .) is not true for biota.

17. Section 9.1.2.2, p. 9-12, para. 2: The last sentence in this paragraph (beginning with "Based on the following . . . ") has substantial implications for the OU5 EE. Please discuss.

18. Section 9.1.2.2, p. 9-12, para. 3: The references cited in this section (i.e., Pendleton et al. 1965 and Hanson et al. 1967) are not in the bibliography.

19. Section 9.1.2.2, p. 9-13, paras. 3 & 4: The relevance of the information in these two paragraphs is questionable.

20. Section 9.1.2.2, p. 9-13, para. 5: The last sentence in this paragraph (beginning with "The authors also reported . . . ") has substantial implications for the OU5 EE. Please discuss.

21. Section 9.1.2.2, p. 9-14, paras. 1 & 2: The relevance of the information in these two paragraphs is questionable.

22. Section 9.1.2.2, p. 9-14, para. 3: The relevance of the statement in the last sentence (beginning with "One would expect very low . . . ") is not clear. Is RFP being specifically discussed. If so, where did the data on contaminant concentrations in environmental media come from?

23. Section 9.1.3.2, p. 9-16, para. 4: What is going to be done with reference to the "candidate species for federal listing?" This paragraph indicates that there is an underlying assumption that the existing data are acceptable to "write off" these taxa. Indicate how the EE will address this issue of candidate taxa.

24. Section 9.2, p. 9-16, para. 6: Cite the relevant portions of the NCP that support an EE.

25. Section 9.2.1, p. 9-17, para. 3: DQOs cannot be developed until data gaps are identified (in Task 2).

Insert the following: " . . . and development of a plan for obtaining . . . "

Provide more detail on the process of "obtaining consensus."

26. Section 9.2.1, p. 9-17, para. 4: All of these activities should have been conducted as part of the work plan development.

27. Section 9.2.1.1, p. 9-17, para. 5: From what can the list of chemicals to be evaluated "be narrowed?"

Should selection criteria be "chemical and species specific?" Please explain.

The one criteria mentioned (likelihood of exposure) is a very strange choice.

28. Section 9.2.1.1, p. 9-20, para. 1: Define the "selection process" mentioned in the first sentence.

The EPA EE manual does not appear to provide guidance for the selection of contaminants of concern.

29. Section 9.2.1.2, p. 9-20, para. 2: The first sentence in this paragraph gives one the impression that key receptor species are defined exclusively on the basis of sensitivity to particular contaminants. Is this true? If not, please modify.

30. Section 9.2.1.2, p. 9-21, paras. 3 & 4: This paragraph indicates that there is feedback from Task 3 to Task 1. The problem appears to be that these two paragraphs are out of place. They actually describe Task 3 activities, and should probably be moved to Section 9.2.3.

31. Section 9.2.1.2, p. 9-21, para. 3: The first sentence indicates that the checklist of OU5 biota will be developed in conjunction with the ecological field inventory. What about the field surveys. Will they not provide information relevant to developing a checklist of OU5 biota?

Reference is made to the "species" in Table 9-5. Many of the taxa in Table 9-5 are not species.

31. Section 9.2.1.2, p. 9-21, para. 4: Are "food web analyses" and "possible tissue sampling" the only subsequent efforts? What about population densities. Cite the tasks and/or document work plan sections where these subsequent efforts are discussed.

Describe the basis for the sample size requirements. What is going to be done with the tissues that will require sample size considerations.

32. Section 9.2.1.2. p. 9-22, Table 9-5: Many of the taxa in Table 9-5 are not species. Change "Receptor Species" to "Receptor Taxon."

33. Section 9.2.1.2, p. 9-23, para. 1: Where is the "final selection of contaminants of concern and key receptor species" to be conducted? Cite the specific task and work plan section.

34. Section 9.2.1.3, p. 9-23, entire section: It is not at all clear how these reference areas will be used in the ecological evaluation. What role do they play. Is DOE talking about making impact vs. reference area comparisons? Please clarify and/or elaborate.

Section 9.2.1.4, p. 9-23, para. 2: The statement to the effect that reference areas " . . . will be selected based on measurement endpoints" is not entirely clear. Please elaborate.

35. Section 9.2.1.3, p. 9-23, para. 3: The first sentence in this paragraph does not appear to make sense.

The sentence beginning with "For OU5, at least one . . . " indicates that comparisons of impacted areas with a single reference area may be planned. We would strongly encourage DOE to reconsider this approach, since a single reference area can be hardly considered representative of the particular habitat type.

36. Section 9.2.1.3, p. 9-23, para. 4: We strongly question whether reference areas can be selected based on the data available for the Task 1 assessment. DOE should assure the reader that such a selection process is defendable at this stage of the assessment.

37. Section 9.2.1.4, p. 9-24, para. 1: This section is completely general and very confusing.

38. Section 9.2.1.5, p. 9-24, para. 3: This section is very inadequate. At this stage of work plan development, DOE should be able to give generic methods and protocols for the field sampling design. Without some indication of design protocols, we cannot adequately review the field program.

The first sentence in this paragraph is very strange.

39. Section 9.2.2, p. 9-25, entire section: Change the name of this section. Delete any references to a "Preliminary Risk Assessment." What is being done here is Conceptual (Risk) Model Development, not a preliminary risk assessment.

Most of these Task 2 efforts should have been conducted as part of the work plan scoping and development.

Some of the Task 2 activities should be split out and integrated with Task 1 activities, since both are part of work plan scoping and development of the conceptual model.

40. Section 9.2.2, p. 9-25, para. 1: The second bullet indicates that data on the nature and extent of contamination will be available for Task 2 activities. Please describe the relationships between Task 2 and RI activities related to abiotic sampling, as well as between Task 2 and Task 3 sampling activities. Describe precisely how the data on the nature and extent of contamination will be used to design the Task 3 activities.

41. Section 9.2.2, p. 9-25, para. 2: In general, discuss the central role of the availability of information on the nature and extent of contamination in conducting these integrated Task 2 & 3 activities.

The first bullet, indicating that existing data will be used to develop a preliminary list of contaminants is not consistent with the second bullet of the previous paragraph (which indicates that data from Phase I efforts on the nature and extent of contamination in abiotic media will be available). If these data are available, why the reliance on historical data?

The second bullet, dealing with initial toxicity testing, also implies that data on the nature and extent of contamination will be available. Please discuss this relationship.

With reference to the third bullet, are habitats not identified and characterized?

With reference to the fourth bullet, what about these plant and animal species will be characterized?

We suggest combining the fifth bullet with the fourth bullet. "General information" is too nebulous. Be specific about what population characteristics will be studied.

With reference to the sixth bullet, as far as we can tell this is the only mention of "gut content analysis."

42. Section 9.2.2.1, p. 9-26, entire section: This literature review should have been conducted as part of the RI work plan scoping and development activities.

The central role of a conceptual model in the organization and synthesis of historical data and identification of data gaps for Task 3 characterization should be recognized and discussed.

43. Section 9.2.2.2, p. 9-26, entire section: This literature review should have been conducted as part of the RI work plan scoping and development activities.

The central role of a conceptual model in the development of the site characterization should be recognized and discussed. The conceptual model would ensure that the site characterization discussion emphasizes those components that influence contaminant fate and transport.

44. Section 9.2.2.2, p. 9-27, para. 3: What "current environmental studies" are being discussed herein.

45. Section 9.2.3, p. 9-27, entire section: In the discussions of air quality, soils, surface water and sediments, and groundwater (i.e., Sections 9.2.3.1 - 9.2.3.4) please reference the sections of

the RI Work Plan where these efforts are discussed in greater detail. If not, then these sections should be rewritten to include more detail.

46. Section 9.2.3.2, p. 9-28, para. 3: The purpose of the Phase I RFI/RI of providing data " . . . for confirming the presence or absence of contamination" is inadequate.

47. Section 9.2.3.2, p. 9-28, para. 4: This paragraph is a conceptual model discussion that should have been presented earlier.

48. Section 9.2.3.2, pp. 9-28 & 9-29, para. 5: The first sentence in this paragraph is strange. Why has this not already been done. Does DOE mean to say that the methods given in this work plan may not be adequate? Does DOE mean to say that the sampling plan for abiotic media characterization might be modified to take into account ecological evaluation needs? Will the data from the abiotic media characterization be available to locate EE sampling stations? Say exactly what you mean here.

49. Section 9.2.3.2, p. 9-29, para. 2: Why were the results in the Final Phase III OU1 RFI/RI Work Plan and Draft Final OU2 RFI/RI Work Plan not evaluated as part of the development of this Phase I RFI/RI Work Plan?

50. Section 9.2.3.5, p. 9-29, entire section: For the following subsections, the activities to be included in the qualitative "field surveys" have not differentiated from those collected in the quantitative "ecological inventory."

For each subsection, discuss what will be done with the data? Why is each data type collected? How will it be used in impact or risk assessment?

51. Section 9.2.3.5, p. 9-30, para. 1: Explain how the "structure of the biological communities" can help "identify potential contaminant pathways.

52. Section 9.2.3.5, p. 9-30, para. 2: Explain how these station locations for these toxicity tests will be selected. Discuss the role of information on the nature and extent of contamination will be used in this selection process.

53. Section 9.2.3.5, p. 9-31, para. 3: What parameters will be measured for the benthic community?

54. Section 9.2.3.5, p. 9-31, para. 4: What will be done for the fish? This paragraph provides no useful information whatsoever.

55. Section 9.2.4, p. 9-32, entire section: Start this discussion with a summary of the information that is available at the initiation of Tasks 4-7. The relationship of Tasks 4-7 to the data/information collection activities is not entirely clear.

Does the "whittling down" of the list of contaminants of concern occur during Tasks 4-7? If so, please discuss in the appropriate sections.

56. Section 9.2.4, p. 9-32, para. 4: The information in the second sentence of this paragraph

regarding the integration of the program design with other ongoing RFI/RI studies is very important, particularly as related to the OU5 Phase I abiotic media characterization. Please elaborate.

57. Section 9.2.6.1, p. 9-33, entire section: This is a conceptual modeling exercise. Please discuss.

58. Section 9.2.6.1, p. 9-34, para. 1: Describe the modeling efforts mentioned in the second sentence in this paragraph.

59. Section 9.2.6.2, p. 9-34, para. 3: Is this the first use of the Phase I abiotic contamination characterization data? Explain how data on the nature and extent of contamination will be used to identify exposure points.

60. Section 9.2.6.2, pp. 9-34 & 9-35, para. 4: Explain why transport and fate modeling might be needed. Be more specific as to the models to be utilized. Unless the potential models are selected early in the process, there is a risk that data needed to parameterize the model will not be collected.

It is not necessary under the NCP to conduct a "worst case" assessment.

61. Section 9.2.6.3, p. 9-35, entire section: This section represents a major departure from the standard "quotient method" of ecological risk assessment. As such, it is very important that the methodologies for this work be presented in detail.

62. Section 9.2.6.3, p. 9-35, para. 1: What "site-specific analytic data" will be used in the estimation of chemical intake? Are concentrations of contaminants in abiotic media the only site-specific data of concern here.

63. Section 9.2.7, p. 9-35, para. 3: The first sentence needs some clarification, particularly with reference to the two mentions of "exposure." Why is ecological data collected in Task 3 not considered in this assessment?

64. Section 9.2.7, p. 9-35, para. 4: This paragraph is critical, because it appears to discuss the impact assessment methodology. Describe in detail the methodology for impact assessment. What endpoints will be utilized? What hypotheses will be tested? Where will these data be taken from? Discuss the implications of the "qualitative nature" of this characterization of adverse effects.

Why go to all this effort beyond the quotient method if impacts cannot be quantified?

65. Section 9.2.8, p. 9-36, entire section: This section is very general and quite incomplete.

66. Section 9.2.9, p. 9-36, para. 3: Explain the circumstances under which additional ecotoxicological studies might be needed. Discuss the selection of stations for this sampling effort.

67. Section 9.2.9, pp. 9-36 & 9-37, para. 4: Describe the types of quantitative data which could be provided in these ecotoxicological studies.

The bullet specific criteria are excellent, and will go a long way to determining the feasibility of the assessment. Now, good luck in finding responses that fit these criteria. Also, please address the multiple contaminant problem.

In the fifth bullet, "power" is 1 minus the Type II error, and the use of both in the sentence introduces redundancy. We suggest changing the "Type II error" to "Type I error." Under certain null hypotheses, the Type I error could be the more important.

68. Section 9.2.9, p. 9-37, para. 1: Where in OU5 are these samples to be collected. Discuss the rationale underlying the sample station selection process that will be employed in Task 9. Discuss the relationship of these station locations to the nature and extent of contamination. Discuss the technical objectives of the sampling effort. What relationships does DOE hope to make in this assessment. How will these efforts provide data useful to risk assessment or impact characterization.

69. Section 9.2.9, p. 9-38, para. 1: The bullet items identifying data-related protocols to be employed in refining the field sampling plan are good. This field sampling plan should be a deliverable, and should be reviewed and approved prior to implementation of the Task 9 sampling program.

70. Section 9.2.10. p. 9-38, para. 2: It is not clear how the tissue analysis will be used to assess impacts. This should be made obvious to the reader. Please discuss in detail. If the means is through the pathway model, please explain in some detail.

The suitability criteria given in the last sentence a different than those presented earlier for "key receptors." Please clarify. Is DOE referring only to key receptors in this sentence?

71. Section 9.2.10. p. 9-38, para. 3: Discuss these samples for environmental media in greater detail. Under what conditions would these samples be collected? Is this discussion related to the Task 3 tissue collections? What strategy is to be employed as far as establishing dose-response relationships from these field data?

With regard to the last sentence, state plainly how the pathways model will be used to assess potential impacts.

72. Section 9.2.10, p. 9-38, para. 4: Discuss the design of these statistical tests in some detail. Reference to DQOs is not satisfactory.

73. Section 9.2.10, pp. 9-38 & 9-39, para. 5: The last sentence in the paragraph indicates that DOE will be very cautious in the selection of biological responses and the implementation of the impact characterization methodology. This approach is to be applauded. Please discuss where the data to evaluate these quantitative considerations will be derived. We presume most of these data come from the Task 3 ecological inventory efforts; however, the quantitative aspects of the Task 3 efforts were not adequately described, and the situation is not clear. Please discuss.

74. Section 9.2.11, p. 9-39, para. 1: The statement that all relevant data will be " . . . integrated

and evaluated in the characterization of potential environmental impacts" is not adequate. The key is how this characterization effort will be carried out. This methodology for risk assessment and impact characterization has not been adequately expressed in this work plan. Perhaps, as part of Task 9, there could be a subsection on "Impact Characterization." That way, there would be something to say with regard to the seventh bullet topic in this paragraph.

75. Section 9.2.11, p. 9-39, para. 3, and p. 9-43, para. 1: This section (titled "Remediation Criteria") seems to arrive unannounced. The use of the "validated" pathway trophic model for establishing remediation criteria has not been properly introduced. DOE should explain why this work is being conducted. What is the value of establishing remediation criteria to this environmental evaluation? Can this model actually be used to assess impacts?

Discuss the methodology for establishing ecological effects criteria (shown in Figure 9-2) in greater detail and with more clarity. Discuss the adequacy of the existing toxicology data base.

76. Section 9.2.11, p. 9-39, para. 3: Some of the discussion in this paragraph is confusing, particularly the sentence beginning with "The "no effects" criteria levels . . . " How does the methodology take into account exposure to multiple contaminants? Discuss the feasibility of this methodology in light of the existing toxicology data base and the prospects for collecting enough tissues for chemical analyses.

Discuss how determination of these criteria for OU5 will be coordinated with other RFI/RI studies and EEs.

76. Section 9.2.11, p. 9-43, para. 1: Discuss how the acceptable criteria will be used in conjunction with ARARs to evaluate potential adverse effects. Discuss the assessment of exposure to mixtures of contaminants.

77. Section 9.3, p. 9-43, para. 3: Discuss the role of information on the nature and extent of contamination (and particularly the results of the Phase I sampling of abiotic media contamination) in the design of the field sampling plan. Provide the general rationale underlying the selection of sampling stations.

78. Section 9.3, p. 9-44, para. 1: The SOPs identified by the first two bullets should be reviewed in detail before this sampling plan receives final approval.

79. Section 9.3.1, p. 9-44, para. 3: Describe the types of quantitative data to be collected during this sampling effort.

With reference to objective No. 2, should a criterion not be sensitivity to the contaminants of concern? We believe this and other criteria were given earlier in this chapter.

Objective No. 4 appears to be very important in that it involves an appraisal of the value of the collected data for quantitative assessment. The process of "determining objectives, measurement endpoints and methodologies for Task 9 field/laboratory contamination studies" should be discussed in detail.

80. Section 9.3.1, p. 9-45, para. 2: This discussion of statistical tests is much too general. If sampling stations can be identified at this stage of the assessment, there must be a rationale underlying their selection. If there is a rationale, there are specific hypotheses to test. DOE should do a better job at explaining potential approaches to quantitative impact assessment.

DOE should also stress the use of these quantitative data to establish samples sizes for acceptable levels of uncertainty.

81. Section 9.3.2, p. 9-45, entire section: Discuss the use of information on the nature and extent of contamination of abiotic media on the selection of sampling stations. It appears from this discussion that very little of this type of information will be available for at least the first ecological inventory and toxicity testing efforts (May-June period).

For all subsections which follow (i.e., Sections 9.3.2.1 to 9.3.2.5), discuss the general rationale for the location of sampling stations.

82. Section 9.3.2.1, p. 9-46, para. 3: Why was this Univ. of Colorado vegetation map not discussed earlier, and used to design the Task 3 ecological inventory?

83. Section 9.3.2.1, p. 9-46, para. 4: This discussion of transects is a little confusing, and would be greatly enhanced by the use of a figure showing the orientation of the transects and their relationship to sampling stations of abiotic media.

Define the criteria for determining an "adequate number" or "adequate sample size," and how this will be implemented in the field. Is adequacy based on a species-area type relationship, or does adequate refer to an acceptable variability of a population parameter (e.g., density) or community measure (species diversity)? Please explain.

84. Section 9.3.3, p. 9-50, para. 1: The first sentence indicates that reference areas will be established only for tissue analysis studies. What about other parameters, such as species diversity, population densities, productivity, etc?

Statements to the effect that selection of " . . . reference areas may be based on criteria developed in the Task 1 preliminary planning process . . . " is very confusing. Why is there uncertainty here?

We are concerned that reference areas can be identified based on the qualitative field surveys of Task 3. Was this the plan?

85. Section 9.3.4.2, p. 9-51, para. 3: Is 10 meters the entire length of the transect? If not, different lengths on the same transect should not be considered individual samples as they are not selected independently of each other.

Is "total herbaceous cover/total fresh weight biomass" a ratio of two parameters or does DOE mean two separate parameters (i.e., total herbaceous cover and total fresh weight biomass). If the former, cite a reference for the use of this ratio.

Describe how Type I and II errors are controlled through the use of this sample size formula.

86. Section 9.3.4.2, p. 9-61, para. 4: Discuss how these (mainly) qualitative data on terrestrial wildlife and invertebrates will be of use in impact assessment. Be specific.

87. Section 9.3.4.2, pp. 9-62 & 9-63, para. 1: This "quantitative information" appears to be mainly qualitative, at least as far as populations are concerned. Discuss how these (mainly) qualitative data will be used in impact assessment.

88. Section 9.3.4.3, p. 9-63, para. 1: Delete the reference to "selected locations along Woman Creek" etc. This was discussed in Section 9.3.2.2.

Is algal density on a per species basis? If so, add qualifier "of each taxon."

How many replicate samples will be collected at each station?

89. Section 9.3.4.4, p. 9-64, para. 1: Why were 3 replicates selected?

With regard to the first bullet, how is the fact that taxa will be identified only to genus consistent with doing species-specific toxicity evaluation. In Table 9-5 there was misuse of the term "receptor species." All of the taxa listed for the macroinvertebrates on this table were families or higher taxa groupings. None were species or genera. Is all this consistent?

90. Section 9.3.4.4, p. 9-64, para. 2: If the taxonomic determination is only to genus, how can you calculate species diversity. DOE probably means taxa diversity. DOE ought to ensure that a consistent level of taxonomic identification and counting is employed throughout the study at all stations for each major taxa group.

References to "pollution-tolerant and pollution-sensitive taxa" seem questionable. By pollution, does DOE mean such things as eutrophication? If so, these categories may not be particularly relevant to this assessment.

91. Section 9.3.4.5, p. 9-64, paras. 3 & 4: This effort includes on gut content analysis. Is this consistent with statements made earlier in Section 9?

The data described herein appear to be basically worthless for impact assessment. Explain how these data will be used to characterize impacts.

92. Section 9.3.6, p. 9-55, para. 2: Discuss the implications of these tissue sample requirements. The clear indication is that these analyses will be conducted on a species-specific basis. It has already been shown in Section 9.3.4.4 that species of benthos will not be identified. We find it unlikely that adequate sized tissue samples can be acquired for periphyton and benthos "species." Yet acquisition of species-specific tissue samples is required for implementation of the criteria development activities. Perhaps DOE should consider grouping taxa into trophic groups for tissue analysis. By pooling the biological material on the basis of trophic grouping, enough biomass may be obtained for tissue analysis.

Discuss the possible need for analysis of tissue for organic contaminants.

What is the difference in "macrobenthos" and "benthos?"

93. Section 9.4, pp. 9-55 & 9-56, para. 6: According to Figure 9-4, Task 100 scoping activities will take two months to complete, while Task 200 activities will require up to four months to complete. Ecological field surveys will not be initiated until Month 3. Given it is now mid April, it is unlikely that any field activities would begin before July 1st. The May-June period for ecological inventory sampling and toxicity testing does not seem realistic, given the need to complete the scoping activities before field sampling can be initiated.